

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

Claim 1 (canceled)

Claim 2 (currently amended): The graft delivery system of claim 1 66, wherein said first elongated instrument further comprises at least one stabilizer to place and hold said first elongated instrument in a pre-determined location.

Claim 3 (canceled)

Claim 4 (currently amended): The graft delivery system of claim 1 66, wherein said coronary guide device comprises a flexible wire.

Claim 5 (currently amended): The graft delivery system of claim 1 66, wherein said aortic catheter further comprises a balloon at one end.

Claim 6 (currently amended): The graft delivery system of claim 1 66, further comprising a perforating guide device capable of perforating a coronary artery.

Claim 7 (currently amended): The graft delivery system of claim 1 66, wherein said second elongated instrument further comprises at least one radio-opaque marker.

Claim 8 (currently amended): The graft delivery system of claim 1 66, wherein said second elongated instrument further comprises at least a first hemostatic object capable of blocking blood flow.

Claim 9 (previously presented): The graft delivery system of claim 8, wherein said first hemostatic object comprises a first channel, wherein said first channel directs said blood flow from one side of said first hemostatic object blocking said blood flow to a second side of said first hemostatic object.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 10 (original): The graft delivery system of claim 8, wherein said first hemostatic object comprises a second channel housing a perforating guide device.

Claim 11 (original): The graft delivery system of claim 10, wherein said perforating guide device is flexible with a sharp end to perforate said coronary artery.

Claim 12 (original): The graft delivery system of claim 6, wherein said second elongated instrument further comprises a flange to direct said perforating guide device towards said coronary artery wall to perforate said coronary artery.

Claim 13 (original): The graft delivery system of claim 8, wherein said first hemostatic object is a balloon.

Claim 14 (original): The graft delivery system of claim 8, wherein said second elongated instrument further comprises a second hemostatic object capable of being positioned with respect to said first hemostatic object to form a hemostatic chamber within said coronary artery.

Claim 15 (original): The graft delivery system of claim 14, wherein said first and said second hemostatic objects comprise a first channel that extends between said first and said second hemostatic objects and is capable of directing said blood flow from one side of said first hemostatic object blocking said blood flow to a side of said second hemostatic object not facing said first hemostatic object.

Claim 16 (original): The graft delivery system of claim 14, wherein said first and said second hemostatic objects are balloons.

Claim 17 (canceled)

Claim 18 (canceled)

Claim 19 (currently amended): The graft delivery system of claim 1 66, wherein the said retrieving device is steerable.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 20 (currently amended): The graft delivery system of claim + 66, further comprising a coupler at each end of said graft.

Claim 21 (original): The graft delivery system of claim 20, wherein said coupler is deformable.

Claim 22 (original): The graft delivery system of claim 20, wherein said coupler comprises at least one sharp prong.

Claim 23 (original): The graft delivery system of claim 20, wherein said coupler includes at least one prong, at least one staple, at least one pin, at least one barb, or a combination thereof.

Claim 24 (original): The graft delivery system of claim 20, wherein said coupler further comprises a bio-compatible adhesive or sealant.

Claim 25 (original): The graft delivery system of claim 20, wherein said coupler includes a wire to attach one end of said graft to said coronary artery and other end of said graft to said aorta.

Claim 26 (original): The graft delivery system of claim 20, wherein said coupler comprises a compressible ring that is capable of forming back to its original shape.

Claim 27 (previously presented): The graft delivery system of claim 26, wherein said compressible ring is made of Nitinol, stainless steel, titanium, polyimide, super-elastic alloys, or combinations thereof.

Claim 28 (original): The graft delivery system of claim 26, wherein said ring is capable of attaching to each end of said graft.

Claim 29 (original): The graft delivery system of claim 26, further comprising a conical-shaped device at least one end of said graft, wherein said ring is compressed within said conical-shaped device.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 30 (original): The graft delivery system of claim 26, wherein one end of said ring is connected to said graft by a downward-direction flexible appendage, prong, staple, pin, barb, or a combination thereof.

Claim 31 (original): The graft delivery system of claim 29, wherein said ring is compressed inside said conical-shaped device at said exterior of said patient's thoracic region.

Claim 32 (original): The graft delivery system of claim 29, wherein said conical-shaped device is tapered and angled.

Claim 33 (currently amended): The graft delivery system of claim + 66, further comprising a sheath within said graft.

Claim 34 (canceled)

Claim 35 (canceled)

Claim 36 (currently amended): The graft delivery system of claim + 66, further comprising an enlarging instrument at each end of said graft.

Claim 37 (original): The graft delivery system of claim 36, wherein said enlarging instrument comprises a dilator or cutter.

Claim 38 (original): The graft delivery system of claim 36, wherein said enlarging instrument comprises a marker to detect said graft's position.

Claim 39 (original): The graft delivery system of claim 38, wherein said marker is a radio-opaque marker.

Claim 40 (currently amended): The graft delivery system of claim + 66, further comprising a fiber optic light/video camera system.

Claims 41-65 (canceled)

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 66 (currently amended): A graft delivery system for using in a mammary artery comprising:

a first elongated instrument that is insertable into a patient's vascular system, wherein said first elongated instrument comprises a mammary catheter and a mammary guide device capable of navigating said mammary catheter to said patient's mammary artery at a pre-determined location;

a second elongated instrument that is insertable into said patient's vascular system, wherein said second elongated instrument comprises a coronary catheter and a coronary guide device capable of navigating said coronary catheter to a coronary artery at a pre-determined location; and

a retrieving device capable of retrieving said mammary guide device and said coronary guide device and extracting said mammary guide device and said coronary guide device through a thoracic aperture in said patient;

wherein one end of said retrieving device is magnetic or electrically charged having an opposite polarity than said mammary guide device, or

one end of said retrieving device comprises a cone-shaped hollow device, or both;

wherein said third elongated instrument comprises a thoracic catheter; and

wherein said thoracic catheter in its diameter further comprises a step-off to limit forward movement of said catheter.

Claim 67 (currently amended): The graft delivery system of claim 66, further comprising a coupler and a third elongated instrument that is insertable from said exterior of said patient's thoracic region into said patient through said thoracic aperture and is navigated by said

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

mammary guide device, wherein said third elongated instrument ~~delivers~~ is for delivering [a] said coupler to a severed end of said mammary artery.

Claim 68 (currently amended): The graft delivery system of claim 66, wherein said first elongated instrument ~~delivers~~ is for delivering a coupler to said severed end of said mammary artery.

Claim 69 (original): The graft delivery system of claim 66, wherein said first elongated instrument further comprises at least one hemostatic object.

Claim 70 (original): The graft delivery system of claim 66, wherein said mammary guide device protrudes outside of said patient's thoracic region.

Claim 71 (original): The graft delivery system of claim 66, wherein said coronary catheter protrudes outside of said patient's thoracic region.

Claim 72 (canceled)

Claim 73 (canceled)

Claim 74 (previously presented): The graft delivery system of claim 67, wherein said coupler comprises a compressible ring that is capable of forming back to its original shape.

Claim 75 (original): The graft delivery system of claim 74, wherein said ring is compressed inside a conical-shaped device.

Claim 76 (original): The graft delivery system of claim 75, wherein said ring is compressed inside said conical-shaped device at said exterior of said patient's thoracic region.

Claim 77 (previously presented): The graft delivery system of claim 67, further comprising a sheath over said coupler.

Claim 78 (currently amended): A method for using a mammary artery as a graft using a graft delivery system comprising:

a first elongated instrument that is insertable into a patient's vascular system,  
wherein said first elongated instrument comprises a mammary catheter and a mammary guide  
device capable of navigating said mammary catheter to said patient's mammary artery at a pre-  
determined location;

a second elongated instrument that is insertable into said patient's vascular  
system, wherein said second elongated instrument comprises a coronary catheter and a coronary  
guide device capable of navigating said coronary catheter to a coronary artery at a pre-  
determined location; and

a retrieving device capable of retrieving said mammary guide device and said  
coronary guide device and extracting said mammary guide device and said coronary guide  
device through a thoracic aperture in said patient;

[of claim 66] said method comprising:

- a) creating a thoracic aperture;
- b) inserting said mammary guide device into said patient's vascular system;
- c) cutting the mammary artery to create a severed end thereof;
- d) navigating the distal end of said mammary guide device to protrude out of the severed end of said mammary artery;
- e) inserting said second elongated instrument into said patient's vascular system;
- f) navigating said second elongated instrument to a pre-determined location in said coronary artery;
- g) protruding said coronary guide device to the outside of said coronary artery,  
thereby creating a coronary aperture;

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

h) retrieving said mammary guide device and extracting said mammary guide device with said retrieving device and retrieving said coronary guide device and extracting said coronary guide device with said retrieving device and from said thoracic region of said patient to outside of said thoracic region of said patient;

i) inserting a thoracic elongated instrument into said patient by way of the thoracic aperture and navigating the distal end of the thoracic elongated instrument through the severed end of the mammary artery such that the distal end of the thoracic elongated instrument exits through the insertion point of the mammary guide device;

j) removing the mammary guide device from the patient and inserting the distal end of the coronary guide device into the proximal end of the thoracic elongated instrument and navigating the distal end of the coronary guide device such that the distal end of the coronary guide device exits out the patient through the insertion point of the mammary guide device of the patient; and

k) attaching said severed end of said mammary artery to said coronary aperture to make a fluid tight connection.

Claim 79 (original): The method of claim 78, further comprising inserting a third elongated instrument through said thoracic aperture, wherein said third elongated instrument delivers a coupler to said severed end of said mammary artery, and said mammary guide device is threaded through said third elongated instrument to provide a navigation path for said third elongated instrument to said severed end of said mammary artery.

Claim 80 (original): The graft delivery system of claim 78, wherein said first elongated instrument delivers a coupler to said severed end of said mammary artery.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 81 (previously presented): The method of claim 78, further comprising inserting a conical-shaped device in said severed end of said mammary artery, wherein said conical-shaped device includes a coupler.

Claim 82 (original): The method of claim 81, further comprising inserting said conical-shaped device, at said severed end of said mammary artery, entirely through said coronary aperture.

Claim 83 (original): The method of claim 82, further comprising releasing said coupler at said severed end of said mammary artery from within said conical-shaped device to attach said coronary artery to said severed end of said mammary artery.

Claim 84 (original): The method of claim 79, further comprising removing said third elongated instrument after delivering said coupler to said severed end of said mammary artery.

Claim 85 (original): The method of claim 78, further comprising removing said first elongated instrument after attaching said coronary catheter to said severed end of said mammary artery.

Claim 86 (original): The method of claim 78, further comprising removing said second elongated instrument after attaching said severed end of said mammary artery to said coronary artery.

Claim 87 (previously presented): The method of claim 78, wherein said mammary catheter further comprises a balloon at one end to hold said severed end of said mammary artery and wherein said mammary catheter and said balloon are attached to said severed end of said mammary artery.

Claim 88 (original): The method of claim 78, wherein said mammary catheter is navigated to a pre-determined location in said coronary artery by said coronary guide device.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 89 (original): The method of claim 78, wherein said retrieving device is a magnetic, electrically charged, or a cone-shaped hollow device end to retrieve said aortic guide device and said coronary guide device.

Claim 90 (original): The method of claim 79, wherein said third elongated instrument is a thoracic catheter having a coupler wherein said thoracic catheter is used to navigate said coupler to said severed end of said mammary artery.

Claim 91 (previously presented): The method of claim 79, wherein said coupler is compressed within a conical-shaped device outside of thoracic region of said patient, and wherein said conical-shaped device is delivered to said severed end of said mammary artery by said third elongated instrument.

Claim 92 (previously presented): The method of claim 79, wherein said coupler is a compressible ring.

Claim 93 (original): The method of claim 91, wherein said conical-shaped device at severed end of said mammary artery includes a dilator to dilate said coronary aperture.

Claim 94 (previously presented): The method of claim 90, wherein said coupler at said severed end of mammary artery is attached to said mammary artery by withdrawing a sheath and expanding a hemostatic object within said thoracic catheter.

Claim 95 (previously presented): The method of claim 79, wherein said coupler at said severed end of said mammary artery is released from within said conical-shaped device by advancing the conical-shaped device relative to the position of the coupler, which is maintained by inflation of a balloon component of said third elongated instrument.

Claim 96 (previously presented): The method of claim 78, further comprising inserting a fiber optic light/video camera system through said thoracic aperture.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 97 (currently amended): The graft delivery system of claim 34 66, wherein said thoracic catheter in its diameter is shaped so as to evert the end of the graft.

Claims 98 and 99 (canceled)

Claim 100 (original): A method for installing a mammary artery as a graft in a patient comprising:

- a) navigating the distal end of a mammary guide device to protrude out of the severed end of a mammary artery;
- b) protruding a coronary guide device to the outside of the coronary artery of said patient, thereby creating a coronary aperture;
- c) navigating the distal end of a thoracic elongated instrument through the severed end of the mammary artery such that the distal end of the thoracic elongated instrument exits the patient; and
- d) inserting the distal end of the coronary guide device into the proximal end of the thoracic elongated instrument and navigating the severed end of said mammary artery with the thoracic elongated instrument to the coronary aperture and attaching severed end to the coronary aperture.

Claim 101 (currently amended): The graft delivery system of claim 17 66, wherein said retrieving device is magnetic at its apical aperture.

Claim 102 (original): The graft delivery system of claim 26, wherein one end of said compressible ring is connected to said coronary artery by a barb, prong, staple, pin, or a combination thereof.

Claim 103 (original): The graft delivery system of claim 26, wherein said compressible ring expands within a lumen of a vessel and conforms to the internal geometry of said vessel.

U.S. Patent Application No. 10/060,958  
Amendment dated March 29, 2004  
Reply to Office Action of December 29, 2003

Claim 104 (canceled)

Claim 105 (original): The graft delivery system of claim 66, wherein said mammary catheter further comprises a hemostatic object.